

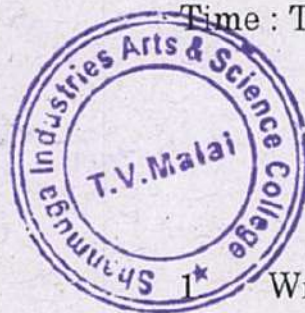
19. Explain the working of UV spectrometers with its instrumentation.
20. Give the principle and instrumentation of Mossbauer Spectrometer and explain its functioning.

NOVEMBER/DECEMBER 2024

GPH41/DPH41 — SPECTROSCOPY

Time : Three hours

Maximum : 75 marks



SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

- Write the basic principle of microwave spectroscopy.
2. Give an example for a linear polyatomic molecule.
 3. Why are some modes of vibrations called normal modes of vibrations?
 4. List the advantages of using ATR technique in IR spectroscopy.
 5. What do you mean by 'Raman Effect'?
 6. Write in short about the sample handlings in Raman Spectrometer.
 7. What is Franck – Condon principle?

8. Name any two important applications of UV spectroscopy.
9. What are Bloch equations?
10. Define chemical shift.

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL the questions.

11. (a) Distinguish between Symmetric top and Asymmetric top molecules.

Or

- (b) Explain the effect of isotopes in rotational spectra.

12. (a) Discuss in brief about the normal mode vibrations of CO₂ molecules.

Or

- (b) How can one interpret the vibration spectra?

13. (a) Write a note on rotational Raman spectra.

Or

- (b) Briefly explain about the quantum theory of Raman Effect.

14. (a) Write in short about the applications of UV spectroscopy.

Or

- (b) Explain in brief about the following

- (i) Selection rules
(ii) Chromophore concept in UV spectroscopy.

15. (a) Explain the Hyperfine Structure of ESR.

Or

- (b) Give the applications of Atomic Absorption Spectroscopy.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. (a) Classify the molecules and tell how a rotating molecule interacts with radiation
(b) Write a note on quadrupole hyperfine interaction.
17. How does an IR spectrometer work? What are its parts? Explain.
18. Apply Raman spectroscopy to determine the structure of a molecule.

